BIOINOCULANT TREATMENT OF UNRETTED GREEN HUSK FIBRE FOR QUALITY IMPROVEMENT

Anita Das Ravindranath and U. S. Sarma
Central Coir Research Institute, Kalavoor
Alappuzha 688522

ABSTRACT

The coir industry is an export oriented one and necessitates continuous supply of the raw material in order to meet the export demands. In order to recoup the shortfall of retted fibre there is an influx of unretted green husk fibre from the neighbouring State and is being utilised for the manufacture of coir products. One of the needs of the hour is to ensure the quality of the raw material by suitable treatments to the unretted green husk fibre. This paper reports the findings of a study conducted on treatment of green unretted husk fibre with bioinoculants to improve its quality. This is the first study on the subject and has been conducted in a field unit on a bulk lot of 3000 kg coir fibre.

INTRODUCTION

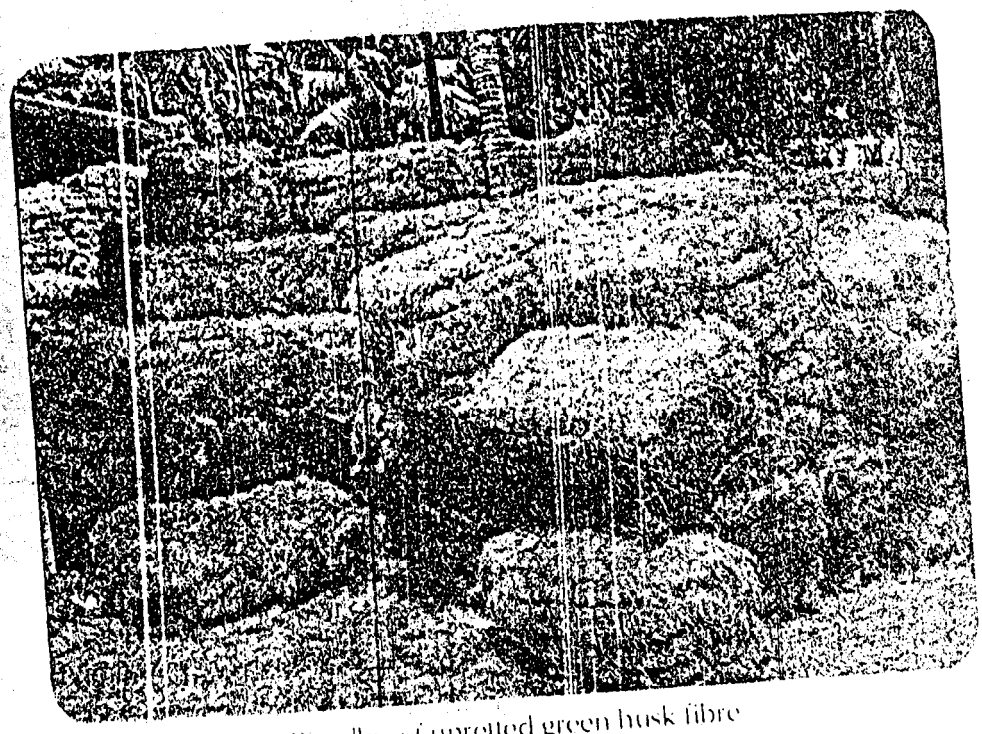
"Kayar" is the processed form of the coir fibre which is extracted from the coconut husk traditionally after 6-9 months of soaking in the saline backwaters of Kerala. This coir fibre forms the basic raw material for the Coir Industry which sustains the livelihood of over half a million households in Kerala. It is an industry which provides employment to a majority of women and menfolk in rural Kerala. The exports of coir and coir products during the period 1991-92 were 30,999 metric tonnes fetching foreign exchange to the tune of about Rs. 74.12 crores which is of importance to the nation.

The saline backwaters in Kerala provide natural retting facilities for coir extraction. However the prolonged soaking period at times result in inadequate availability of sufficient raw material to cater to the demand of the industry. Therefore an alternative source of the raw material was found in the fibre from green husks subjected to mechanical extraction without soaking in backwaters. The disadvantage of this fibre was that it could not provide the quality of the retted fibre due to its reddish tinge which deepened by the passage of time on exposure to the open environment. This could be attributed to the oxidation of the surface polyphenolics resulting in the tanning of the raw fibre. It was therefore envisaged that subjecting the fibre to soaking in water could remove these surface polyphenolics partially and thereby yield a better material for processing. A further removal of the phenolics could be achieved by seeding of phenol degrading strains of bioinoculants

thereby bestowing a natural "retted" effect to the coir fibre.

MATERIALS AND METHOD

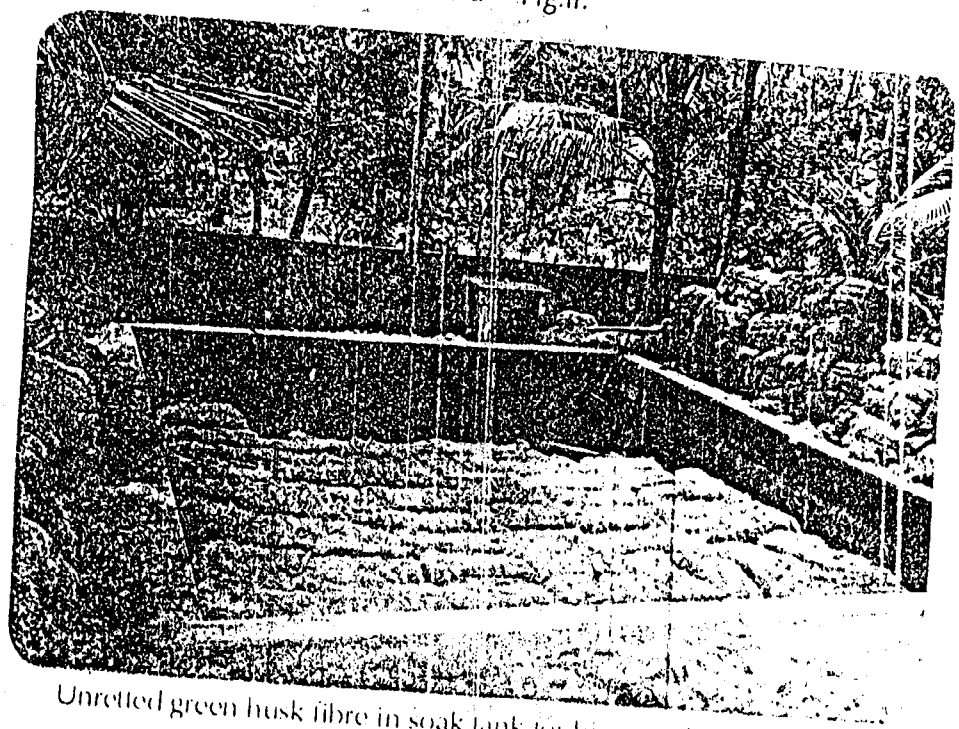
A field trial was taken up at a fibre extraction unit at Poochackkal near Cherthala. The green husk fibre taken up for the study was from the Pollachi area in Tamilnadu and a total of 100 bundles of the fibre amounting to approximately 3000kg of the raw material was taken up for the study. The study was conducted in a concrete tank with facilities for flushing of the water into and out of the tank. The strains of bacterial cultures used for this study were CBMB, CBMD and CBPD which are selectively phenol degrading species. These cultures were inoculated into 20 litres of nutrient medium in culture flasks and large petridishes and incubated for a period of ten to fourteen days.



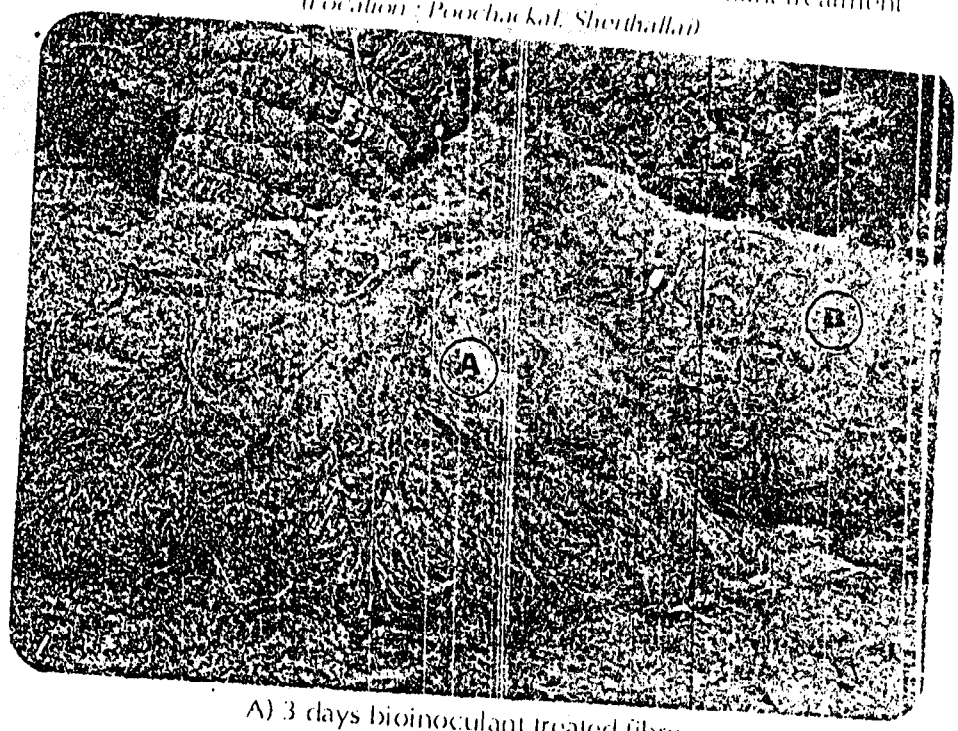
Bundles of unretted green husk fibre

The full grown bacterial biomass was seeded into the soak tank one day after soaking of the fibre when a substantial quantity of the polyphenolics are expected to be released into the surrounding waters. The study was monitored daily and samples of fibre were drawn out for observation. The water from the soak tank

was drained out after three days of soaking and refilled and 10 bundles of fibre drawn out . The parameters studied on the water samples collected at different periods of time are furnished in Fig.1 The fibre was subjected to spinning and the coir yarn samples were subjected to light fastness studies. The test results are furnished in Fig.II.



Unretted green husk fibre in soak tank for bioinoculant treatment
(Location : Poochakal, Sherthallai)



A) 3 days bioinoculant treated fibre
B) Unretted green husk fibre

RESULTS AND DISCUSSIONS

Fibre samples were drawn out from the soak tank after each day of soaking and the observations noted after drying. It could be noted that the fibre drawn out after 3 days of soaking could yield fibre of a brighter hue which could be compared to the "retted" fibre with respect to colour. Studies on the light fastness to sunlight was tested by xenotest testing methods as detailed in Fig.II.

The green husk fibre is mixed together with the retted husk fibre in varying ratios depending upon the quality of the unretted husk fibre. By improving the quality of unretted fibre it can be taken up for use at seasons when there is an acute shortage of the retted fibre and to cater to urgent demands for the manufacture of coir products.

ACKNOWLEDGEMENTS

The authors express their deep gratitude to Shri K. George Joseph, Chairman, Coir Board for his keen interest and encouragement in this work. Thanks are due to Shri N.C. John, Managing Partner, N.C. John & Sons for providing the raw material and facilities for conducting the experiment.

(as per British Standard fastness to daylight)

FIG.I

DETAILS OF PARAMETERS STUDIED DURING SOAKING OF UNRETTED GREEN HUSK FIBRE AT POOCHAKKAL, SHERTALLAI

PARAMETER	OBSERVATION OF SOAKING					
	DAY NUMBER					
	1	2	3	4	5	6
PH	6	6	6	6	6	6

BLANK

FIG.II

LIGHT FASTNESS STUDIES

SAMPLE	DESCRIPTION	GRADE
A	COIR YARN SAMPLE FROM UNRETTED GREEN HUSK FIBRE	I
B	COIR YARN SAMPLE FROM GREEN HUSK FIBRE TREATED WITH BIOINOCULANTS.	II
C	COIR YARN SAMPLE FROM GREEN HUSK FIBRE FROM CONTROL SOAK TANK	II

**GRADE I FADING WITHIN 80 MINUTES TEST EXPOSURE.*
**GRADE II FADING AFTER 145 MINUTES TEST EXPOSURE.*

TEST METHOD - Exposure to Xenon arc lamp Quarzlampen Gesellschaft M.B.H., Hanau FRG. Light and dark method.
HUMIDITY - 70%
TEMPERATURE - 37 DEGREES
TEST - 1006:1955

References

1. **Anita Das Ravindranath**

   Processing of Coir-A biological approach to Retting of Coconut Husks-CORD Vol. VII, No.2 July 1991.

2. **Nagarajan R, Das Anita Sreekumar, Prabhu G.N.**

   Effect of prior crushing on Retting of Coconut Husks - Proceedings of the seminar on Coir Research, September 1985.

3. **Nagarajan R, Das Anita Ravindranath, Prabhu G.N.**

   Studies on Seeding of Ret microflora on Coconut husks-COIR Vol.XXXI, July 1987.

4. **Das Anita Ravindranath**

   Preliminary Studies on the polyphenols in Coconut Husks-COIR Vol. XXXV January - June 1991.

5. **Anita Das Ravindranath**

   Coir Pith-Potential Wealth in India-Proceedings of the Seminar on Coir pith in Agriculture, Tamil Nadu Agricultural University, Coimbatore, November 20th 1991.

6. **Anita Das Ravindranath**

   Application of Biotechnology in the Extraction of Golden Coir - Paper presented at the International Conference on Biotechnology, BIOTEK INDIA - 92 at Bangalore in October 1992.